	Application No.	Applicant(s)
Notice of Allowability	09/697,088	KITAMURA ET AL.
	Examiner	Art Unit
	Kevin Bates	2155

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *11-30-2005*.

2. ☒ The allowed claim(s) is/are *18-23, 27-29, 31-33, 35, and 36 which are renumbered 1-14*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some*   c) ☐ None   of the: .

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

    Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _2-8-06_

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

SALEH NAJJAR
SUPERVISORY PATENT EXAMINER

Response to Amendment

This Office Action is in response to a communication made on November 30,

2005.

The Information Disclosure Statement was received on February 8, 2005 and

has been considered.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes

and/or additions be unacceptable to applicant, an amendment may be filed as provided

by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be

submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview

with George Yee (Reg. no. 37,478) on February 15, 2005.

The application has been amended as follows:

In the claims:

Please amend claims 18, 20, 27, 29, 31, and 35 to read:

18.   (Currently amended): A method of sharing data in a computer

system, said computer system comprising a first computer, a second computer, and a

storage system comprising a disk control unit, a first disk unit, a second disk unit, and a

third disk unit, the method comprising:

forming a first duplex state between said first disk unit and said second

disk unit, wherein said disk control unit, in response to a write request from said first

computer, stores write data associated therewith to both said first disk unit and to said second disk unit, wherein said disk control unit, in response to a write request from said second computer, stores write data associated therewith to said third disk unit;

forming a simplex state and sending a first message from said first computer to said second computer indicating forming of said simplex state, wherein said disk control unit, in response to a write request from said first computer, stores write data associated therewith only to said first disk unit, wherein said disk control unit, in response to a write request from said second computer, stores write data associated therewith to said second disk unit;

subsequent to receiving said first message performing at said second computer a re-mapping operation between said second disk unit and said third disk unit; and

forming a second duplex state between said first disk unit and said third disk unit and sending a second message from said second computer to said first computer indicating forming of said duplex state, wherein said disk control unit, in response to a write request from said first computer, stores write data associated therewith to both said first disk unit and to said third disk unit, wherein said disk control unit, in response to a write request from said second computer, stores write data associated therewith to said second disk unit.

20.   (Currently amended): A method of sharing data in a computer system, said computer system comprising a first computer, a second computer, and a storage system comprising a disk control unit, a first disk unit, a second disk unit, a third disk unit, and a fourth disk unit, the method comprising:

forming a duplex state between said first disk unit and said second disk unit, wherein said disk control unit, in response to a write request from said first computer, stores write data associated therewith to both said first disk unit and to said second disk unit, wherein said disk control unit, in response to a write request from said second computer, stores write data associated therewith to said fourth disk unit;

forming a simplex state and sending a message from said first computer to said second computer indicating forming of said simplex state, wherein said disk control unit, in response to a write request from said first computer, stores write data associated therewith only to said first disk unit; ~~and~~

subsequent to receiving said first message, copying data stored in said second disk unit to said third disk unit and then performing at said second computer a re-mapping operation between said third disk unit and said fourth disk unit, wherein subsequent to said ~~copying~~ re-mapping said disk control unit accesses said third disk unit in response to I/O requests from said second computer; and

re-forming said duplex state between said first disk unit and said second disk unit, wherein said disk control unit, in response to a subsequent write request from said first computer, stores write data associated therewith to both said first disk unit and to said second disk unit.

27.   (Currently amended): A method of sharing data in a computer system, said computer system comprising a first computer, a second computer, a first storage system coupled to said first computer and comprising a first disk unit and a first disk control unit, and a second storage system coupled to said second computer and comprising a second disk unit, a third disk unit, a fourth disk unit, and a second disk controller unit, wherein said first disk control unit and said second disk control unit are coupled via a network, the method comprising steps of:

forming a duplex state between said first disk unit and said second disk unit, wherein said first disk control unit, in response to a write request from said first computer, stores write data associated therewith to both said first disk unit and to said second disk unit, wherein said second disk control unit, in response to a write request from said second computer, stores write data associated therewith to said fourth disk unit;

terminating execution of applications in said first computer;

subsequent to said terminating, forming a simplex state, wherein said first disk control unit, in response to a write request from said first computer, stores write data associated therewith only to said first disk unit;

subsequent to said step of forming a simplex state, sending a message from said first computer to said second computer indicating said simplex state, wherein said second computer performs copying data stored in said second disk unit to said third disk unit and subsequent to said copying, <u>performs a re-mapping between said third disk unit and said fourth disk unit so that</u> said second disk control unit <u>now</u> accesses said third disk unit, in response to I/O requests from said second computer<u>;</u> <u>and</u>

re-forming said duplex state between said first disk unit and said second disk unit, wherein said disk control unit, in response to a subsequent write request from said first computer, stores write data associated therewith to both said first disk unit and to said second disk unit.

29.   (Currently amended): A storage system comprising:

a disk control unit; and

a plurality of disk units,

wherein said disk control unit is operable to form a duplex state between a first disk unit and a second disk unit, wherein data associated with a write request from a first computer is stored to both said first disk unit and to said second disk unit, wherein a third disk unit is accessed to service an I/O request from a second computer,

wherein said disk control unit is further operable to form a simplex state between said first disk unit and said second disk unit, wherein data associated with a write request from said first computer is stored only to said first disk unit,

wherein during said simplex state, an application executing on said first computer sends a message to said second computer indicating forming of said simplex state, wherein data stored in said second disk unit is copied to a third disk unit ~~and said second disk unit is accessed to service an I/O request from said second computer~~,

wherein ~~in response to said message~~ <u>subsequent to data being copied</u> <u>from said second disk unit to said third disk unit,</u> ~~said second computer performs~~ a re-mapping of said second disk unit and said third disk unit <u>is performed so that said</u> <u>second disk unit is accessed to service subsequent I/O requests from said second</u> <u>computer,</u>

wherein another duplex state is formed between said first disk unit and said third disk unit so that data associated with subsequent write requests from said first computer are stored to both said first disk unit and to said third disk unit.

31.   (Currently amended): A storage system comprising:

a disk control unit; and

a plurality of disk units,

wherein said disk control unit is operable to form a duplex state between a first disk unit and a second disk unit, wherein data associated with a write request from a first computer is stored to both said first disk unit and to said second disk unit, wherein data associated with a write request from a second computer is stored to a fourth disk unit,

wherein said disk control unit is further operable to form a simplex state, wherein an application executing on said first computer sends a message to said second computer indicating forming of said simplex state, wherein data associated with a write request from said first computer is stored only to said first disk unit,

wherein during said simplex state, data stored in said second disk unit is copied to said third disk unit and subsequent to said copying, data associated with a write request from said second computer is stored to said third disk unit as a result of a re-mapping performed between said third disk unit and said fourth disk unit,

wherein said duplex state is re-formed between said first disk unit and said second disk unit.

35.   (Currently amended): A storage system comprising:

a disk control unit;

a plurality of disk units; and

a network connecting at least some of said disk units,

said disk control unit being operable to copy data stored in a first disk unit to a second disk unit via said network,

said disk control unit being operable to form a duplex state between said first disk unit and said second disk unit, wherein data associated with a write request from a first computer is stored to both said first disk unit and to said second disk unit, wherein data associated with a write request from a second computer is stored to a third disk unit,

said disk control unit further being operable to form a simplex state, wherein an application executing on said first computer sends a message to said second computer indicating forming of said simplex state, wherein data associated with a write request from said first computer is stored only to said first disk unit,

wherein during said simplex state, data stored in said second disk unit is copied to a third disk unit and, subsequent to said copying, said second computer accesses said ~~third~~ second disk unit as a result of a re-mapping performed between said second disk unit and said third disk unit,

wherein another duplex state is formed between said first disk unit and said third disk unit so that data in subsequent write requests from said first computer are stored in both said first disk unit and said third disk unit.

Please cancel claim 30.

In the drawings:

The following changes to the drawings have been approved by the examiner and agreed upon by applicant: in "Fig. 1, data storage subsystem "3", should be "3a". Similarly, in Fig. 3, data storage subsystem "3", should be "3b". Also, the data storage subsystem should be shown to include "a fourth disk 34'"". See the specification on page 8, line 7.. In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance:

The primary reason for allowance is that the examiner has found that the prort art of record does not teach or suggest or render obvious a method or a storage system that forms duplex and simplex states between a first, second, and third disk unit. More specifically, the prior art on record does not teach a first duplex state made between the first and second disk units, in which a first computer gets access to the first disk unit and the second computer gets mapped to the third disk unit, a second duplex state made between the first and third disk unit, where the first computer accesses the first disk unit and the second computer accesses the second disk unit, nor a simplex state where first, second, third disk unit operate independently, and the second computer gets mapped to the second disk unit. The differences between the prior art and the claimed invention is further discussed in the applicant's remarks filed on November 30, 2005 and is present in all the independent claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Bates whose telephone number is (571) 272-3980. The examiner can normally be reached on 8 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saleh Najjar can be reached on (571) 272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KB

KB
February 16, 2006

SALEH NAJJAR
SUPERVISORY PATENT EXAMINER